

Andrew Duncan, Senr. Esq. M.D.  
with the Author's respectful Compliments

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OUTLINE  
OF A  
NATURAL SYSTEM  
OF  
MEDICAL SCIENCE.

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GOVERNMENT

OF

THE DISTRICT OF COLUMBIA

FOR

THE DISTRICT OF COLUMBIA

# OUTLINE

OF A

## NATURAL SYSTEM

OF

# MEDICAL SCIENCE.

FORMING THE PRELIMINARY LECTURES TO TWO  
COURSES : ONE ON ANATOMY AND PHYSIOLOGY;  
THE OTHER ON PATHOLOGY AND THE  
PRACTICE OF MEDICINE.

BY ALEXANDER WALKER, Esq.

LECTURER ON PHYSIOLOGY, ETC.

EDITOR OF THE ARCHIVES OF UNIVERSAL SCIENCE,  
&c. &c.

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*By pronouncing diseases incurable, physicians have attempted to enact a law of  
neglect, and to exempt ignorance from discredit.*

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LORD BACON.

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TO

ALEXANDER MONRO, ESQ. SENIOR,  
*M. D. Professor of Medicine, Anatomy and Surgery,  
in the University of Edinburgh, &c.*

This Outline of a Natural System of Medical Science is most respectfully dedicated by one who is grateful for the benefits he has conferred upon Anatomy and Physiology, and who is desirous of following his footsteps in the cultivation of these Sciences.

ALEXANDER WALKER.

2, North College Street, }  
27th October 1808. }



## ADVERTISEMENT.

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*IN this small Work, the Author has delivered a very brief Outline of a Natural Systematic Arrangement and Theory of Anatomy, Physiology, Pathology and of the Materia Medica, as strictly dependent on each other.*

*Of this system the tendency is, not to controvert one established fact of Medical Science, but by pointing out their relations, to simplify, to consolidate and if possible to increase the amount of our knowledge in all the departments of Medicine.*

*As a work of this kind is a fair object of criticism ; to the philosophic and liberal reviewer I have only to say, that I shall most willingly submit to his decision. Error is almost inseparable from propositions of any extent or magnitude, and I have doubtless committed many. But to the reviewers for the Edinburgh Medical and Surgical Journal, and those of a London Review under their influence, as they constitute a party somewhat in opposition to my views, I have to observe, that, should they act unjustly, as I know them not individually, I must hold their editor, whom I do know, responsible for their conduct, and I consequently shall do so.*



# PRELIMINARY LECTURE

TO THE COURSE OF

## ANATOMY AND PHYSIOLOGY;

EXHIBITING

THE OUTLINE OF A NATURAL SYSTEM OF

THESE SCIENCES.

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GENTLEMEN,

THE functions of man are the most interesting objects of Science. Physics and Morals are equally involved by them. It is in them that the physical sciences terminate, and that the moral sciences have their origin.

Of what avail are the former, but to develop the influence of external bodies upon the functions of man? What are the latter, but the results of the reaction of that influence upon men in society?

To explain them is the business of physiology; and if it have hitherto failed in doing so—if it have even neglected the noblest of all the functions—I should say the noblest branch of philosophy—the intellectual functions of man, and have abandoned them to persons totally incapable of developing them, because totally ignorant of the structure on which they depend, and who have left them in a

state of greater obscurity than that in which they found them, that is the fault of physiologists, and not of their science.

In these lectures, I shall at least be influenced by the deepest sense of such errors.

But it is not merely the philosophy of the human mind, or rather of the intellectual functions of man, that have thus been abandoned to barbarism. The science itself has never been systematized; and all its individual parts have been so neglected, that the other sciences and the arts dependent upon it, have been left in similar obscurity.

I shall endeavour to shew that it is by the aid of physiology alone that, in explaining the functions of the eye, for instance, we can render perfect the theories of colour and of vision; that, in explaining the functions of the ear, we can construct rational ones of phonics and of hearing; that in explaining the functions of the organ of voice, we can illustrate the formation of letters, and the origin of languages; that, in explaining the functions of the muscles, we can establish those first principles of taste in the fine arts, the very existence of which have so often been questioned, and so deliver a theory of movement and of attitude, applicable to sculpture, the higher species of painting, gesture in oratory, &c. In fine, it is by physiological means only, that we can construct a natural theory of medicine, and render precise and easy, the most delicate and the most difficult of the operations of surgery.

To effect these purposes, nothing is more necessary than arrangement, because it at once involves facts and their theory, or the reasonings founded upon them.

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In considering a natural arrangement of Anatomy and Physiology, it appears to me an unquestionable point, that it ought to indicate, at a single glance, the relation of all the functions to and their dependence upon each other.

It is upon this principle that I have constructed the natural arrangement which I am about to detail; and a single remark upon the arrangements adopted by the most celebrated modern physiologists, will, at once, shew the originality of the plan which I propose, and point out the errors of arrangement which I deprecate.

Blumenbach, Chausier, Dumas and Bichat, treat of circulation before absorption, on which it depends, and even before mastication, deglutition and digestion, on which, in general, even absorption itself chiefly depends.

If the arrangement of Chausier in particular, who, in this respect, is as accurate as any of them, were to be considered as indicating the relation and dependence of the functions, so absurd is it, that absorption instead of the cause, would be the result of nutrition, generation the result of absorption, and digestion the result of generation. Thus, by arranging effects in the place of causes, they confound the relations of the functions, and reverse the very order of their dependence.

The division of the functions into external and internal, as anciently proposed by Aristotle, and afterwards successively adopted and improved by Buffon, Grimaud and Bichat (the last of whom substituted for them the terms organic and animal) is still more faulty.

Anatomy, I divide into three parts, namely that which considers the mechanical or loco-motive organs, that

which considers the vital organs, and that which considers the intellectual organs.

Under the mechanical or loco-motive organs, I class, first, the bones which support the rest of the animal structure; second, the ligaments which unite them; and third, the muscles which move them.

Under the vital organs, I class, first, the organs of digestion, the absorbent surfaces, and the vessels which absorb from these surfaces; second, the heart, lungs and blood-vessels, which derive their contents (the blood) from the absorbed lymph; and third, the organs of secretion, which separate various matters from the blood. Then follow the generative organs, which, though generally formed into a distinct class from the vital, ought not by any means to be so reckoned. For it is evident, that they form, as it were, the sequel of the vital organs, being dependent on secretion—the last of the vital functions, and destined merely to propagate vitality, and to communicate it to a new series of beings.

Under the intellectual organs, I class, first, the organs of sense, where impressions take place; second, the brain or organ of judgment, where these excite ideas; and third, the nerves, where volition results from the last.

This is a natural arrangement of the anatomy of animals, and its peculiar simplicity is illustrated by its involving, in application, that of minerals and vegetables, and by its being capable of instant adaption to physiological science.

In order to arrange Animal Physiology, it is only necessary to substitute the term “functions” for “organs;” and that science will likewise involve, in application, the physiology of mineral and vegetable bodies, and be, in its turn, capable of instant adaption to medical science.

Thus, the functions also are divided into Mechanical, Vital and Intellectual.

The mechanical functions are subdivided into that of support, that of connection, and that of loco-motion.

The vital functions are divided into that of absorption, that of circulation, and that of secretion.

The intellectual functions are divided into that of sensation, that of mental operation, and that of volition.

A circle of functions, I may observe, thus exists in animals, which exists not in minerals or vegetables, because volition, the last of the intellectual functions, connects itself to the mechanical ones, by rendering them subservient to it in loco-motion. Thus the first and the last of these functions are as intimately connected as any of the intermediate ones, and a beautiful circle of organic function and organic influence is formed.

The plan of the course will, therefore, be precisely the same with that which I have proposed for Anatomy and Physiology in general.

I. In that part of the course which relates to the mechanical organs and functions, will be explained the structure and uses, *1st*, of the bones which support the rest of the animal machine; *2dly*, of the ligaments which unite it; and *3dly*, of the muscles which move it.

II. In the first part of the course which relates to the vital organs and functions, will be explained the structure and uses, *1st*, of the organs of mastication, deglutition and digestion, of the absorbent surfaces, and of the vessels which absorb from these surfaces; *2dly*, of the heart, lungs and blood-vessels, which derive their contents, (the blood), from the absorbed lymph; and, *3dly*, of the organs of secretion, which separate various matters from the blood.

Throughout this division in particular, the analogies from vegetables will be explained.

III. In that part of the course which relates to the intellectual organs and functions, will be explained the structure and uses, *1st*, of the organs of sense which receive impressions from external objects; *2dly*, of the brain, where these impressions excite ideas; and, *3dly*, of the spinal marrow and nerves, where volition results from the last. In this division, will be also explained, as founded upon original observations, certain criteria of the various degrees of the sensitive, perceptive and voluntary powers possessed by different animals, as well as the nature of sensation, perception and volition themselves.

As in physiological enquiries, comparative anatomy and comparative views alone can destroy an hypothesis or transmute it into a theory, I shall throughout the course introduce all its principal facts.

The machines, says Cuvier, which are the object of our researches, cannot be demonstrated without being destroyed. We have no means of discovering what would result from the absence of one or several of their parts, and consequently we remain ignorant of the operation of each of these parts in producing the total effect.

Fortunately, nature herself seems to have prepared for us the means of supplying that want which arises from the impossibility of making certain experiments on living bodies. The different classes of animals exhibit almost all the possible combinations of organs. We find them united, two and two, three and three, and in all proportions; while at the same time it may be said that there is no organ of which some class or some genus is not deprived. A careful examination of the effects which result from these unions and privations is therefore sufficient to enable us to form

probable conclusions respecting the nature and the use of each organ, or form of organ.

In the same manner, we may proceed to ascertain the use of the different parts of the same organ, and to discover those which are essential, and separate them from those which are only accessory. It is sufficient to trace the organ through all the classes which possess it, and to examine what parts constantly exist, and what change is produced in the respective functions of that organ, by the absence of those parts which are wanting in certain classes.

Thus, says Richerand, the cellular structure of the lungs which cannot be clearly demonstrated in man, on account of the excessive tenuity of their smallest lobuli, evidently displays itself in the vesicular lungs of salamanders and frogs; in the same manner, the scales covering the bodies of fish and reptiles, or the claws of birds, give us a just idea of the structure of the epidermis, and of the disposition of its small laminæ that are laid over each other on a part of their surface, &c.

Vegetable life, justly, says the same author, compared in its resources and effects with animal life, would throw very great light on several phenomena, which, at present, it is difficult for us to conceive and to explain.

The medical treatment of vegetables, which is almost entirely surgical, would be equally benefited by these researches.

Thus the wounds of vegetables, like those of the human body, are much less dangerous when their surface is smooth, than when their edges are rough, lacerated, or contused. Trees cut down with a saw bud with difficulty, whilst those felled with an axe vegetate more briskly.—The saw tears the vegetable structure and produces a greater or less alteration in organization. The unequal surface of

a tree thus cut down retains humidity, as destructive to the trunk, of which it induces a rottenness, as too great a quantity of pus, that so habitually moistens the surface of an animal wound, destroys granulation and prevents cicatrization.

In considering the application, or rather the relation of physiology to philosophy in general, the philosophy of mind will be particularly dwelt upon.

In considering the application of physiology to the fine arts, the error in the construction of the antique statues, and of those of Michael Angelo, both with regard to the individual muscles supposed to be brought into action, and with regard to a hitherto unobserved principle of attitude, will be carefully pointed out.

In considering the application of physiology to the medical and surgical arts, a view of a new, simple and impressive natural system of medical science in general, and of its first principles as an art, will be exhibited; and rules will also be given for performing surgical operations with the utmost precision and ease, upon the principle of an invariable relation between the arrangement of internal, and the situation of certain external parts, which consequently form accurate signs of that arrangement.

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I may now observe, that the series of beings which the arrangement I have just delivered involves, all more or less evidence the phenomena of life and intellect, as well as exhibit structure, and I may conclude with a few observations concerning these phenomena.

Minerals have properly been said to exist, plants to exist and live, animals to exist, live and think.

These are all modifications of each other, as I shall afterwards shew; but, at present, I shall limit my observations to the two last of these classes, and to the additional phenomena, namely those of life and intellect, which they more strikingly exhibit.

I shall not, however, like some of the most celebrated modern physiologists, occupy my preliminary lectures with long details concerning their nature; but, as I reckon life to be the mere result of organization, I shall, throughout the course, illustrate it in connexion with those organs on which it depends, and shall, at present, only take a general view of its nature.

Life is a term which some philosophers have hitherto inaccurately employed as expressing an imaginary principle, though it merely designates a series of dependent actions. This they were doubtless induced to do by that artifice which has ever induced weak men to assume an air of knowledge by giving a particular name to what they did not understand; and the same artifice still induces such persons to blame those who endeavour to explain the phenomena of life according to obvious physical laws, precisely because a successful explanation would at once exhibit their ignorance and their desire to conceal it.

Life has, with equal absurdity, been termed a forced state, though it merely evinces a series of phenomena in justest unison with those of the universe. I dissent, therefore, from those who assert, that we employ the terms *life* and *vital force* to express what are apparent exceptions to general laws. This is only a repetition of the error of Brown. It was, however, an erroneous conclusion from accurate observations.

For example, says Cuvier, let us contemplate a female in the prime of youth and health,—that elegant vo-

luptuous form—that graceful flexibility of motion—that gentle warmth—those cheeks crimsoned with the roses of delight—those brilliant eyes, darting rays of love, or sparkling with the fire of genius—that countenance enlivened by sallies of wit, or animated by the glow of passion, seem all united to form a most fascinating being. A moment is sufficient to destroy this illusion. Motion and sense often cease without any apparent cause; the body loses its heat; the muscles become flat; and the angular prominences of the bones appear; the lustre of the eye is gone; the cheeks and lips are livid.... These, however, are but preludes of change still more horrible. The flesh becomes successively blue, green and black. It attracts humidity; and while one portion evaporates in infectious emanations, another dissolves into a putrid sanies, which is also speedily dissipated. In a word, after a few short days, there remains only a small number of earthy and saline principles. The other elements are dispersed in air and in water to enter again into new combinations.

This, Cuvier adduces as a proof that the possession of life prevents the operation of external physical causes. The picture is perfectly correct, but the conclusion unauthorised.

It was indeed impossible for us not to feel the frequent necessity of deploring those we loved. We therefore thought that we perceived this principle operating when the evident influence of external causes, or some mysterious agency seemed to drive the noblest results of life, intellect and genius, from the philosopher and statesman, who had, by the diffusion of truth and resistance to arbitrary power, preserved the liberties, and aggrandized the happiness of nations; we thought we perceived their influence when imagination's powers fled from the poet whose song had

once almost conferred new life on the heroes of ancient times ; we thought we perceived their influence when the phenomena of vital action disappeared in the body of the patriot hero in whom they had once developed the noblest specimen of that generous love of social life which induced him to devote his existence to his country's weal ; we thought we perceived their influence when those magic charms abandoned the lovely female whose powers had once excited from the philosopher those splendid epithets that ranked her with the other objects of his adoration, celestial truth and god-like genius—which had obtained even from the poet those wonderful strains that at once immortalized him and the object of his song—which had commanded, even in the hero, those glorious devotions which, for far too short a period, illustrated the ever memorable days of chivalry. When those eyes whose soft languor had fascinated every beholder, those cheeks where life had often spread the crimson veil of love—when these were gone, those eyes were dim and sunk, those cheeks were pale, those lips were livid, that bosom depressed, that form rigid and icy cold, when all had thus assumed the darkest and most frightful hues, had gradually lost cohesion and become one mass of horrible putrescence, whose infectious effluvia now threatened destruction almost welcome to those who once adored the animated being—it was scarcely possible to feel all this, and avoid the conclusion that life was a state of force.

It was doubtless this unknown and imaginary power connecting the various phenomena of organic structure that gave origin to the idea of life. But that they are no state of force is proved by this, that while the only notion we have of them is motion—successive attraction and repulsion, electricity, fire &c. exhibit precisely corresponding

phenomena, and the last of these was, I believe, on that single account, considered as the symbol of life and intellect by the great Zoroaster.

This and similar facts, I may remark, convince me, that the earth has myriads of times been illumed by the highest attainments of intellect, and as often plunged into darkness. This single point of Indian philosophy was, in my opinion, but the mere shadow of the highest excellence in philosophy in general ; and as the greatest cultivation of the human mind, and the greatest misapplication of its faculties, cannot well exist together, I am equally convinced, that the beautiful specimens of art, blended with heterogeneous absurdities, in the monuments of Upper Egypt, afford the most striking proof that, contrary to the common assertion, there *were* periods in that country when tyrants held no despotic sway over the physical, nor the priests of a false religion over the moral structure of man.

But to return to the subject.—True it is that the affinities of external agents with the molecules of organic bodies are precisely the same during life when their influence is resisted as after death when it operates with the greatest energy ; but the power which during life organic bodies possess of resisting the influence of external agents, and even the extension of the sphere of their action beyond the mere bounds of the living body, is, in my opinion, very easily accounted for.

All the particles of matter possess attraction and repulsion, and the largest homogeneous masses, *ceteris paribus*, evidence them most. Hence, organic bodies, while they possess homogeneity by the subsistence of intimate relations between their parts, evidence attraction and repulsion in the highest degree. While in infancy, these relations are merely forming, the powers of attraction and re-

pulsion are weak ; when, in the vigour of life, these relations are most intimate, these powers are greatest ; when, in old age, these relations are interrupted, these powers are also diminished ; and when, in death, these relations cease to exist between the molecules, or in other words, when the body is no longer organized, the power of combined resistance terminates.

Thus, life is no forced state, but an intrinsic power arising merely from the intimate relation of these molecules, and the greater effects which, in such combinations, they are capable of producing, than when, in death, they have become independent of each other, and their powers disunited, are capable of much less effectual resistance.

Thus, it is, that I would endeavour to shew a connexion between the phenomena of living bodies, and the general laws of nature.

This general and common motion of all the parts, says even Cuvier, forms so peculiarly the essence of life, that the parts which are separated from a living body soon die, because they possess no motion of their own, and only participate in the general motion produced by their union. Thus, according to the beautiful expression of Kant, the mode of existence of each part of inanimate bodies belongs to itself ; but, in living bodies, it resides in the whole.

When, I say, that life consists in motion, I make no assertion derogatory to the Deity, for every philosopher is of opinion that motion is to us as mysterious as life ; and when I endeavour to trace in its phenomena a correspondence with physical laws, I conceive that I pay the truest homage to a Dicty. At all events, it would be dishonest of me to give my sanction to opinions respecting a difference which seems to me not to subsist.

The same causes which terminate motion terminate life. Life begins by motion, and terminates when it ceases; but very curiously it also terminates in consequence of it. In other words, the motion wears out the machine in which it takes place. For, while the functions are most dependent, life encreases; and their very independence, though, to a certain extent, the grand aim of existence, destroys it. The very cause of decay commencing when the different functions have acquired their greatest vigour, arises precisely from their having acquired that vigour, and being, at that moment, most capable of a species of warfare, if I may so term it, with each other, as well, as in some measure, from the greater number of accidents to which a complexity of functions is liable.

That, at this period, the functions may, in a certain sense, be said to combat each other, will be evident to every one who, for a moment, considers that great exercise of the loco-motive functions uniformly interrupts the vital and intellectual, or of the vital functions injures the loco-motive and intellectual, or of the intellectual functions injures the loco-motive and vital.

These powers are always in an inverse relation to each other.

Grimaud seems to have had some idea of this, with regard to the first and second classes of functions. He, says Richerand, has given the most extensive development to the idea of the constant opposition between those two series of actions, over which preside, according to the opinion of this physician, two powers, which he calls loco-motive and digestive. It is marked in no species of animals more than in the carnivorous, which connect with senses abounding in stratagem, and muscles capable of extraordinary action, an assimilating power of so low a de-

gree, that their aliment, in order to be conveniently digested, must possess a composition analogous to that of their organs.

Thus, the independence which the functions acquire, and the interruptions which their operations present to each other, subjects them to the common laws of impeded motion, and its result, a separation of parts.

When, in manhood, their unison is most complete, life is most vigorous. When, in old age, this unison ceases, life disappears. Hence also, I am convinced, it is, that those animals whose functions are longest dependent on each other, and who remain longest helpless, longest enjoy organic existence.

As motion only can result from motion, so life can only result from life. The vital actions of all animals originate in those of their parents, from whom they are detached precisely when their actions become sufficiently independent of them. I am convinced it is upon this principle, that the egg is detached from the ovary and the fœtus from the uterus, as well as because, in these cases, the ovary and the uterus themselves, after long quiescence, recover an independent action of their own. The same power which enables an organic body to act by itself, forces it to separate from another.

Life then seems, in a great measure, to consist in the successive attraction and repulsion of particles—properties equally common to minerals, vegetables and animals, though in different manners and degrees. Life, however, is not here to be confounded with sensibility, which nevertheless I shall afterwards shew is also possessed by all of them. Life seems inseparable from generation, nutrition and decay, or, in other words, from origin, increase, diminution—a progression which minerals and vegetables

pass through as well as animals. Minerals also increase by additions to their external surfaces, vegetables by absorbing from without inward, and animals by absorbing from their internal as well as external surfaces.

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By the intellectual functions, I understand the actions of the intellectual organs, or, in other words, those actions which constitute mind. With soul—the sacred and revered province of theologians, I do not wish in the slightest degree to interfere; not for the harsh reason assigned by athiests, namely, that the whole empire of ignorance, the direction of the basest passions, and the gun or bayonet of the soldier are under their command (these are sentiments which I never shall profess), but for a juster and a better reason, namely this, that soul is, in truth, their proper province.

Sensation, then, seems to be entirely dependent on touch, which, in the other senses, is only modified so that one receives one kind of it, and another receives another; thus the tongue is touched by means of liquids, the nose by means of odours, the ear by aeriform vibrations, and the eye by light.

All the other intellectual functions are nevertheless mere modifications of sensation. Upon them, therefore, we shall not dwell, but, by taking into view some important facts in anatomy, which have a relation to all of them, I shall be able to explain sensation in particular.

Sommering has observed, that man has the largest brain in proportion to the nerves given off from it; and that this proportional magnitude, may, in every instance, be referred to as the best criterion of the degrees of intelligence. Now, it appears to me not at all difficult to account for this

fact (the general truth of which may be granted), by comparing it with another not less important, viz. that, in the inferior classes of animals, the nervous system becomes, as you descend, more and more widely diffused.

Hence, I deduce this important principle, viz. that the degrees of intellect are, in all animals, in exact proportion to the concentration of the nervous system.

Now, the more equally distributed this system is, the more independent of each other are the parts of organized beings, or, in other words, the necessity of a connection of these parts increases, in proportion to the magnitude of the common trunk compared with the rami. It is only, therefore, in the more perfect animals, that the connection of the different parts of the nervous system, and particularly the presence of central parts, is necessary to the existence of the different functions.

Animals, on the contrary, having this sensitive substance very generally diffused, when mutilated, recover their figure, or, when cut into pieces, form several individuals, having each a system of sensation and volition. The larger warm-blooded animals acquire pieces of flesh analogous to those which have been cut away; crabs acquire new claws; the tadpoles of frogs and water newts acquire new limbs and tails; and the lower end of the snail, having been divided from the upper, acquires a new head. The earth and boatworm, when divided into considerable pieces, form several new individuals; but animals having this system still more generally diffused, as the polypus, when divided into the smallest fragments, each fragment self-exists and becomes a perfect individual.

This also is more or less the case with plants. As you descend among them, their parts become less depen-

dent on each other. The dicotyledons, which possess irritability, sleep and the principle of life most diffused, and which, among plants, are analogous to the dicordated animals, namely quadrupeds and birds, possess concentric fibres and the most diffused sensibility; the monocotyledons, analogous to the monocordated animals, namely reptiles and fishes, possess more numerous centers and less diffused sensibility; and the acotyledons, analogous to the acordated animals, possess most numerous centers and least diffused sensibility.

As, in some worms and zoophytes, there is indeed no appearance of nerves, and certainly none in plants, which yet possess sensibility, all this gradually approaches to the attraction and repulsion of the magnet and electrics, which, like some of these, are divisible almost to infinity, and yet possess their various powers, which, like the sensibility of the superior animals, connected by nerves, are only evidenced when led by conductors.

Hence, I conclude, that sensation, understood in this limited sense, as distinct from perception, and differing, *toto coelo*, from soul, is, like extension, an imprescriptible property of all matter: but it may exist in as many forms and as many relations as it; in its separate particles; in larger combinations, as polypes; in still larger ones, as worms and insects, where these extended and sentient particles, connected by nerves, have more extensive relations and more complete dependence on each other; or uniting to constitute perception in whole bodies, as in the more perfect animals, where a sensorium commune exists, and where, in consequence of the most exquisite arrangement, and the finest relations, no particle can be deranged without affecting all the rest.

It is indeed, these various degrees in which it appears, that afford a strictly analogical proof of its existence as a primary property of matter.

As man then has not only sensation in the separate parts, but perception arising from the whole, the descent is gradual to beings which have merely sensation in distinct parts, but no general perception ; and thence equally gradual to beings which have sensation limited to their individual particles.

Now, as the perceptions of two of the superior animals cannot unite to form one perception, so the sensations of two parts of a polyp cannot combine in perception ; nor is it of course more wonderful, that the sensations of two of the minute particles of matter cannot unite in one common sensation.

As we do not expect electricity to be evidenced without conductors, why should we expect sensation, in any great degree, without those nerves which are its conductors? It would be as irrational to deny the former, when conductors are not present, as to deny the latter (understood as I have defined it), when nerves are absent.

Neither is it more wonderful that these sensations, thus limited, are not evidenced ; because it is scarcely to be expected, that the functions of that should be evident, the absolute structure of which is unknown, and because it is exactly in proportion to the concentration of sensation (and by no means to its division) that it is, at any time, evidenced.

Upon the same principle, it is, that the particles of a pigment, when in contact, are more evident than when extended over an immense surface, or that a combination of pulleys and one cord produce more evident motion than each of them, with separate cords, could separately. But it is unnecessary to accumulate illustrations—the principle

pervades all nature, and every natural operation illustrates it.

Nor do we merely find evident sensibility thus produced by the various arrangements of matter : it is implicitly dependent on all the changes of bodies, and is identified with their motions, by being suspended whenever these are suspended. Of this, the hybernation of animals, the winter state of most plants, the state of the embryo in utero or in ovo, of the chrysalids of insects, the nymphs of worms, and the seeds of plants, afford examples.

Nor is this all : but evident sensibility may be produced and destroyed at pleasure by a mere alteration in the arrangement of the particles of one and the same body ; as in the wheel animal, and the anguillæ of tiles.

Nor is even this all : you may, if you choose, by the mere arrangement of the particles of matter, as I shall afterwards prove by experiment, at once produce myriads of animals, and bestow upon them motion, or in other words, the phenomena of sensibility. This, the experiments of Spallanzani, contrary to his own inclination, decidedly prove.

If it be objected, that it may be as fairly argued, that sensation is something combined with these forms of matter, I answer, that we are not entitled to suppose any thing an independent being which never appears but in combination.

Now, as we have shown that sensation is implicitly dependent upon, or connected with motion ; and as this and all the other functions of the brain, are entirely the results and modifications of sensation, they also must be dependent on or connected with motion.

Far be it from me to pretend to account for mental operation by mere physical motion. But, that motion accompanies all these processes, I am certain ; nor can the

supposition that motion is made use of in the most mysterious operations of the mind, possibly detract from the honour of a Deity, or from our admiration of natural operations.

We have little need to be afraid of a moderate and rational materialism. It is the idealism of Berkeley, it is the scepticism of Hume—those dangerous opponents of such materialism, that have so deeply injured philosophy and religion. It is according to these systems, that prophets, apostles and miracles, are only ideas in the mind; and, indeed, the unreasonable dislike to a rational materialism, is alone chargeable with having led to the dangerous scepticism of Hume.

That physiologists, then, should so long have permitted others to encroach upon their proper province, is disgraceful to them, and has been most mischievous to science. To this is owing the barbarism of the doctrine of mind. As physiologists abandoned it, philosophers found it difficult to give it a name.—Some called it morals—others metaphysics—and others, the philosophy of the mind. But I have just endeavoured to shew, that it is neither morals nor metaphysics, nor the philosophy of the mind—but the philosophy of the intellectual organs of the human body.



# FIRST PRELIMINARY LECTURE

TO THE COURSE OF

## PATHOLOGY AND

## THE PRACTICE OF MEDICINE;

EXHIBITING

THE OUTLINE OF A NATURAL SYSTEM OF

PATHOLOGY, MEDICINE AND THE

MATERIA MEDICA.

GENTLEMEN,

I SHALL not, on the present occasion, detain you with prefatory remarks; but, as a fairer proof than any I can adduce, of the necessity of such a course of lectures as I now propose, shall merely repeat to you, upon this subject, the sentiments of one whom genius in the science and skill in the art of medicine have elevated high in his profession, and whose eloquence is not less admirable than his professional abilities.

“To ally anatomy,” says he, “more closely with surgery, to connect the art more intimately with the science from which it flows, seems to me a task as yet imperfectly accomplished, though of the very highest importance.—Anatomy is not made interesting to the pupil as the basis of our reasoning on disease, the rule of our prognostications, the sole guide in operating: He is taught to know the parts

and remember their names, and then he is dismissed from the school; and of this school we are all pupils, abandoned early in our career, left to learn, in the hurry of practice, the very principles of the science!—The anatomy of surgery differs widely from that taught in the schools.—Pathology, which ought to unite science with art, is a sort of neutral ground betwixt the two provinces of anatomy and surgery, little regarded on either hand.”

To obviate these important defects is the very object of the present lectures.—I shall assiduously study to supply all of them; I shall, after delivering a natural system of medical science in general, the tendency of which is not to controvert one established fact, but by pointing out their relations, to consolidate, to simplify and if possible to increase the amount of our knowledge on all the subjects of medicine—I shall, I say, after this, enter into all its details, point out the relative situation of those parts which perpetually come under the care of the surgeon, explain all the variety of the applications of an original, fundamental and universally applicable principle of surgical operation, and endeavour to direct the student, while, with his own hand, he performs each of these operations.

Public bodies, Gentlemen, as well as individuals, have too often opposed the progress of science. . . But, when have they been able to impede it?—Never. The iron grasp of tyranny and the intrigues of malice are alike innocuous to truth; the progress of science is irresistible and triumphant.

On the present occasion, I feel it my duty to propose a new system, nor do I expect very different treatment; for though the gun of the soldier and the anathema of the priest be no longer connected, the malice of the interested and the intrigues of party occupy their place: the former

were the measures of a barbarous; the last are those of a half-polished age. Fortunately, however, far from being formed to fear opposition—I court it.

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The following sketch of a natural system of medical science is founded on the strict basis of physiology, and is, I trust, calculated to place, in a new and more interesting point of view, the beautiful relations which subsist between the sciences of anatomy and physiology and the art of medicine, as well as to lay the foundation of a more rational system of medical science.

I do not, however, make this statement without a feeling of the utmost deference to the labours of the celebrated Cullen and Brown—the authors of the existing systems and of innumerable observations of the highest value in medical science. Nothing less than the firmest conviction of the truth and simplicity of the system I am about to propose, could have induced me to deliver it.

First, however, I shall proceed to exhibit the present state of medical science.

No system of the medical art can be just in its principles, and perfect in its application, which does not consider the derangement of the mechanical, vital, and intellectual functions *distinctly*, and trace each disease to the operation of its cause in the derangement of that particular function which was first produced, and which led to the derangement of all the rest.

It has been the fate of all systems to be founded upon partial views of the functions. The system of the celebrated Cullen, for example, was founded merely upon the vital functions, and even upon a very limited portion of

them—the state of the capillary vessels. Considering its extent, however, it was valuable.

The system of Brown, likewise, was similarly founded merely upon the state of the intellectual or nervous functions. That system, therefore, although worthy of consideration, is not founded upon a view of all the animal functions, and consequently does not rationally account for all their derangements in disease. The basis of its author's discovery was his mistaking the mere elasticity or reaction of matter for a peculiar property of living bodies, which he termed excitability. For excitability, when it seems to have been exhausted, is apparently restored by still stronger stimuli, upon the very same principle that greater pressure brings into action the remaining elasticity of a spring which had already lost some portion of it.

But what is worse, Brown totally forgot that matter has other properties, and that the constitution of animals admits of other derangements than those affecting their elasticity or their excitability. Extension, for instance, another property of matter, may be destroyed in the living body, by fracture, rupture, &c.; and there evidently it is not excitement that is first produced, or that is worthy either of the first or of the greatest consideration. Brown's doctrine, then, refers chiefly to the state of the nervous functions. Its chief merit is, that it involves a great portion of their pathology. It is because it does so, that men of ingenuity have often embraced it; and it is in reality because it did not do more—because it did not involve the pathology of the other two classes of functions, that men of much observation opposed it; and that even many of those men of genius who, throughout Europe, had adopted it, were afterwards forced, they scarce knew why, to abandon it.

Certainly, in all diseases, the nervous functions must be affected ; but they may be affected through the vital or mechanical functions—by means, for instance, of an aneurism or a fracture. A fracture or an aneurism, however, have no existence as diseases under the Brownian system. These are whimsically, absurdly, termed stimuli ; not diseases, but mere causes of disease ; and the attention of the physician is, upon the principles of that hypothesis, ridiculously turned from the immediate disease to others depending upon it, to the state of the nervous functions. And for what purpose ? Not, by their aid, as mere accessory and subordinate considerations, which in this case they really are, to regulate the disease of the mechanical or vital functions, from the very first the most obvious, but in order to discover the very existence of any disease ; as if fracture or aneurism in themselves were not alarming diseases, independently of their effects upon other parts of the system ; as if the injury done to the mechanical functions, to locomotion, was less worthy the name of disease than that done to the intellectual functions, to nervous motion. Yet, in practice, the Brownian, even supposing that the nervous system were little or not at all affected, would instantly abandon his hypothesis, and demonstrate its inapplicability, by recurring to the injury of the mechanical functions, by setting the fractured limb, or operating for the aneurism. In the first of these instances, indeed, the primary disease, almost the only one worthy of consideration, is the injury done to the mechanical functions, to locomotion, which has absolutely nothing to do with excitability or excitement.

It is not my view, however, intirely to exclude these systems, or to depreciate their real value, but to show that they merely form portions of a natural system. Still no system of the medical art can be perfect, which does not

consider the derangement of the mechanical, vital and intellectual functions *distinctly*, and enable us to trace each disease to the operation of its cause in the derangement of that particular function, whether mechanical, vital, or intellectual, which was first produced, and which led to the derangement of all the rest.

These opinions I may support by the observations of others. “Efforts laborieux et multipliés,” says Pinel, “de Sauvages, Cullen, Sagar, Vogel, Linné, Nietzki, Selle, Van-Denheuvell, &c. pour distribuer toutes les maladies connues en classes, en ordres, en genres, en especes, à l'exemple des botanistes, et toujours pour résultat une extrême surcharge du tableau, une classification à bitraire et vacillante, des affections symptomatiques prises pour des maladies primitives, une multiplication excessive des unes et des autres par des complications sans nombre des maladies, une sorte d'impossibilité avouée d'obtenir un ensemble régulier qui ne porte que sur quelques points fondamentaux, et qui vienne se placer sans efforts et sans confusion dans la memoire.”

I cannot better explain my opinion of the present state of medicine than by using, respecting it, the language of Lord Bacon, which is, at this moment, as applicable to it, as it was when first written. “We see,” says he, “the weakness and credulity of men is such, as they will often prefer a mountebank or witch, before a learned physician, and, therefore, the poets were clear-sighted in discerning this extreme folly when they made Æsculapius and Circe, brother and sister, both children of the sun.—For, in all times, in the opinion of the multitude, witches, and old women, and impostors have had a competition with physicians. And, what followeth? Even this; that physicians say to themselves, as Solomon expresseth it upon an higher

occasion, If it befall to me as it befalleth to the fools, why should I labour to be wise? And, therefore, I cannot much blame physicians, that they use commonly to intend some other art or practice which they study more than their own profession. For, you shall have of them, antiquaries, poets, humanists, statesmen, merchants, divines, and in every of these better seen than in their own profession; and, no doubt, upon this ground, that they find that mediocrity and and excellence in their art maketh no difference in profit or reputation toward their fortune; for the weakness of patients and sweetness of life, and nature of hope, maketh men depend upon physicians with all their defects."

But Lord Bacon has assigned an amply sufficient reason for these circumstances. In another place, he says, "Medicine is a science which hath been, as we have said, more professed than laboured, and yet more laboured than advanced, this labour having been in my judgment, rather in circle than in progression. For I find much iteration, but small addition." Now it is, in reality, this profession without labour, this labour without advancement, so well expressed by Lord Bacon, this iteration without addition, which is the real and sufficient cause (overlooked by him) of the poets so properly making *Æsculapius* and *Circe*, brother and sister, and of the world uniformly placing witches, old women and impostors in competition with physicians. And again his lordship, with equal justice, says, "in the inquiry of diseases, they do abandon the cures of many, some as in their nature incurable, and others as past the period of cure; so that Sylla and the triumvirs never proscribed so many men to die, as they do by their ignorant edicts, whereof numbers do escape with more difficulty, than they did in the Roman proscriptions. Therefore I will not doubt to note as a deficiency, that they

inquire not the perfect cures of many diseases, but, pronouncing them incurable, do enact a law of neglect and exempt ignorance from discredit."

It therefore becomes proper to ascend to the cause of the little success which has hitherto attended medical investigation, and to attempt, by the removal of that cause, to accelerate its progress, and, by increasing the success, to increase the respectability of the art:.

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The grand cause which has hitherto retarded the progress of medicine, has been the total want of a general principle, and this want has arisen from the very low state of physiological theory.

It has ever appeared to me that a sufficient distinction has not been made between diseases as affecting various functions, which to the most superficial observer seem to be very different in their nature. It would appear, at first sight, that, instead of almost uniformly applying mental remedies to mental diseases, the physician not only does not distinguish what stages and parts of the same disease are mechanical, what vital and what intellectual, which must uniformly be the case where all the functions are involved, but that he does clearly perceive such a distinction at all to subsist in any form or combination of disease.

The physician has also failed to attend to a correct arrangement of the various articles of the *materia medica*, which ought not to be considered merely as stimulant, sedative, &c. but as in reality operating upon different functions.

Besides these, there appear to be other subordinate objects of inquiry, which he has hitherto, to a certain extent, overlooked; namely, that medicines seem to be ob-

jectionable from the injury which they do to those functions which are the vehicles of their operation, the uncertainty also of their effects as influenced by association, the uncertainty of their continuance as dependent on the same and other causes, the difficulty of removing their bad effects, and the injury they do to the intellectual functions in making man entirely the creature of direct impression instead of reflection.

I shall now, then, proceed to point out the mode of obviating this state.

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These seem to me to be points eminently worthy of consideration, and the best mode of obviating the objections they involve, is a greater attention to natural theory and arrangement.

But, in order perfectly to remedy these great defects, the cultivation of physiology is primarily necessary. As far as the accumulation of facts goes, it has, however, already been cultivated, and that most assiduously. But before these accumulated facts can afford a principle of medicine, they must afford a theory of physiology, and, before they can afford this, they must be arranged according to their relations to each other.

I may here observe, that the sciences alone afford theories, the arts admit merely of principles upon which these reasonings or theories are applied to the wants of man. Thus, in every step of their progress, the arts must implicitly depend upon the sciences.

Now medicine is purely an art and admits of a principle derived from physiology by which the theories of that science may be applied to the cure of diseases.

As, however, no general theory of physiology exists, it becomes necessary to inquire what systematic arrangement can be given to its facts, as strictly founded on those of anatomy, in order to obtain one. And I know none so unexceptionable as that arrangement which I have already publicly delivered, nor any general theory so rational as the one which results from it.

I shall now, therefore, restate these arrangements, and then try their applicability to the medical art.

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Anatomy I divide into three parts, namely, that which considers the mechanical or loco-motive organs, that which considers the vital organs, and that which considers the intellectual organs.

Under the mechanical or loco-motive organs, I class, first, the bones which support the rest of the animal structure; second, the ligaments which unite them; and, third, the muscles which move them.

Under the vital organs, I class, first, the organs of digestion, the absorbent surfaces, and the vessels which absorb from these surfaces; second, the heart, lungs and blood-vessels which derive their contents (the blood) from the absorbed lymph; and, third, the organs of secretion which separate various matters from the blood.

Under the intellectual organs, I class, first, the organs of sense, where impressions take place; second, the brain or organ of judgment, where these excite ideas; and, third, the nerves, where volition results from the last.

This is a natural arrangement of the anatomy of animals, and its peculiar simplicity is illustrated by its involving, in application, that of minerals and vegetables, and

by its being capable of instant adaption to physiological science.

In order to arrange animal physiology, it is only necessary to substitute the term "functions" for "organs;" and that science will likewise involve, in application, the physiology of mineral and vegetable bodies, and be, in its turn, capable of instant adaption to medical science.

Thus, the functions also are divided into mechanical, vital and intellectual.

The mechanical functions are subdivided into that of support, that of connection and that of loco-motion.

The vital functions are divided into that of absorption, that of circulation and that of secretion.

The intellectual functions are divided into that of sensation, that of mental operation and that of volition.

In order to arrange medical science, for the term "healthy functions," the subject of physiology, it is only necessary to substitute the term, "diseased functions."

The classes of disease are, therefore, like those of anatomy and physiology, three, namely, diseases of the mechanical or loco-motive functions, diseases of the vital functions, and diseases of the intellectual functions.

The orders of the first class, as affecting the functions of the bones, the ligaments and the muscles, are three, viz. diseases of support, diseases of connection, and diseases of loco-motion.

Those of the second class, as affecting the functions of the absorbent, circulating and secreting vessels, are likewise three, viz. diseases of absorption, diseases of circulation and diseases of secretion.

Those of the third class, as affecting the functions of the organs of sense, of the brain and of the nerves, are

also three, viz. diseases of impression, diseases of judgment and diseases of volition.

The genera, under each order, consist of diminished, irregular and increased function.

This arrangement of disease likewise involves in application, that of minerals (if we choose to maintain the analogy and to give that term to mere injury of structure) and of vegetables, as well as animals. The first have what may be termed diseases of mechanical structure ; the second have diseases of mechanical and vital functions ; whilst the third have diseases of mechanical, vital and intellectual functions ; corresponding with the observation that animals exist, vegetables exist and live, and animals exist, live and think.

Precisely in the same way, would I class the articles of the *materia medica* ; first, as operating upon the mechanical, vital or intellectual organs, and then as either increasing, rendering irregular, or diminishing their action.

In this natural arrangement, I must again remark, that all its parts correctly correspond and beautifully flow from each other ; while anatomy is the basis of physiology, physiology, in its turn, is the basis of medicine ; the classification of one is applicable to the rest, and all of them at once involve mineral, vegetable and animal nature.

Such arrangement, as it lays the foundation of a new system of each, will, I trust, soon shed some light over anatomical, over physiological, and particularly over the dark paths of medical science ; but it must be remembered, that this exhibits merely a sketch of the application of my general arrangement to medical science, and that sketch necessarily brief and deprived of every illustration. Yet, even after this sketch, I think I may add, in the words of Lord Bacon, that “ the harmony of a science, supporting

each part the other, is and ought to be the true and brief confutation and suppression of all the smaller sorts of objections."

I shall now, however, further explain the principles upon which the natural system is constructed.

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The correctness of this arrangement, as strictly founded on physiology, is confirmed by the following observations.

Disease is change of the healthy state and of the healthy action of parts. It is change of the state as well as of the action of parts, because action depends on state, life itself on organization, and it is only by affecting this state—the structure of the objects acting, that change of action can be produced. In fracture, as far as the bone is concerned, the action peculiar to it—loco-motion is affected; as the blood-vessels are ruptured, their action is affected; as the nerves are injured, their peculiar action is also affected.

Thus each has its peculiar action, and the action of each is affected through the medium of its structure; but the affection of the state and action of the vessels or nerves is not, in fracture, the primary disease, but only an extension of it to other parts or other functions, or, more properly, they are new diseases, because they affect new functions, and, though dependent upon it, are, in their nature, entirely different from fracture—the primary disease.

The action, for instance, of vessels in absorbing, circulating and secreting, so far as, in vegetables, for instance, the form and arrangement of their capillary tubes are concerned, or the continuation of the action commenced

in these tubes, or the effusion of their contents when ruptured, is evidently independent of nerves; and I believe, were this principle traced further, it would be found to account for many of the actions of animal as well as vegetable parts. Whether true or false, however, it cannot materially affect the system. For whether their action is dependent on nerves or not, it is, strictly speaking, their own action, and, by injury, they are rendered incapable of performing it.

Disease may thus properly be defined, any change of the healthy state and healthy function of parts. If any one urge, that disease implies the action, not the state of parts, I grant it; but must observe that *change* of state is action, and change of healthy state is evidently morbid action or disease, whether it arises from within or without, whether suddenly from external and accidental causes, or more slowly within the body and in dependence upon other previous derangement.

Indeed to trace any disease back through previous derangement is actually to trace out other diseases, and to define any disease from others thus traced out, is to abandon those distinctions which separate the termination of one disease from the commencement of another.

If any one still assert, that disease is not change of the state but change of the action of parts, and urge that those accidents which depend on external causes, as fracture, considered in themselves, are not disease, I should say, were this even proved, it could only affect my arrangement by giving the term injuries, instead of diseases, to the first class. As, however, it seems to me that they may justly be named diseases, and that practically considered they are precisely the same, I shall retain that term. Thus, we shall have a fairer view of the interesting analogies

high, as will be seen, exist between the animal, vegetable and mineral worlds.

Now, if disease consist in change of function, different diseases must either consist in different changes of the *same* function or in the changes of *different* functions; the former, viz. different changes of the *same* function, as being a more minute division, making evidently the genera which are subordinate; the latter, viz. changes of different functions, as being more general, forming the orders which include these genera.

From the inspection of the table, and a consideration of the nature of disease, it will appear, that whatever is commonly reckoned one disease, is generally, perhaps always, three; thus fracture is always accompanied by inflammation and pain; and while the simple fracture is a disease of diminished support, the inflammation caused by it is a disease of increased circulation, and the pain caused by it a disease of increased impression.

As individual diseases are not arranged under the table, I may, in order to render my meaning perfectly obvious, give one or two examples of this mode of classification. Thus with regard to the classes or first and most general divisions of disease, *fracture* is a disease of the mechanical functions, *syphilis* of the vital functions, and *mania* of the intellectual functions. With regard to the orders or second and less general divisions of disease in the last of these classes, *amaurosis* is a disease of impression or sensation, *mania* of mental operation, and *paralysis* of expression or volition. And with regard to the genera or subdivisions of disease in the second of these orders, *fatuitas* is a disease of diminished mental operation, *mania* of depraved mental operation, and *vigilia* of increased mental operation. Farther, with regard to the combination of disease under

the last class, (sleep itself consisting in the quiescence of almost all the intellectual functions), *dreaming* consists chiefly in the quiescence of sensation, *somnambulism* chiefly in that of mental operation and *incubus* chiefly in that of volition.

With regard to the articles of the *materia medica*, or rather with regard either to external or internal applications, the correctness of my arrangement, as indicating their influence upon the different classes of organs, will, on the slightest consideration, appear equally evident; pressure, for instance, affects the mechanical, mercury the vital and opium the intellectual system. But, like the diseases which they remedy, it will appear, that each of these also affects all of the functions, though in a less direct manner than that which I have just now particularly pointed out as its object, and upon which the exact place of each in a systematic arrangement ought to depend.

It cannot, therefore, be a just objection to this arrangement, that it throws each of what are commonly called diseases under these different classes, as, in reality, each of the common diseases is more properly three, and exists under three natural classes. Even in this way, does every physician, though unaware of it, consider them, and therefore, instead of giving any new complexity to nosology, it merely explains and simplifies that complexity which ever has existed in the nature of disease. In other words, it is natural, and developes and simplifies only the combinations of nature.

Thus, no one disease, properly so called, can, with the slightest truth, be said to fall under three different classes, as inflammatory and suppurative phthisis, which are even commonly reckoned distinct stages, or as fracture, inflammation, &c. which are essentially different in their

nature and may actually be combined in every possible form. Thus it can serve no useful purpose to reckon them one disease, while it destroys every natural arrangement and all the invaluable consequences dependent on it, and absolutely leads first to confusion, next to false reasoning and then to the most fatal errors in actual practice.

Although, however, nosology must thus, in any thing like a natural arrangement, be fixed most accurately upon the basis of physiology, the classification of every disease may be derived from the particular derangement of that individual function which occasions the derangement of all the rest, and not from the derangement of all the three functions which would render names uselessly complex.—I say uselessly, because, as the whole of any one disease, commonly so termed, is primarily dependent on the derangement of one function, so health is to be recovered chiefly by the restoration of that function, and the mode of cure is chiefly indicated by the name of genus under which the disease is *primarily* arranged. This last is one of the most important consequences of such a system.

If, however, the names of diseases and their classification are not thus made dependent most strictly on each specific change from the healthy state described in physiology, they are at once arbitrary and unnatural; the pathology and nosology of which they constitute a part, have not their foundation in physiology, nor is the practice constructed upon them indicated by the reasonings it delivers.

To reckon a series of occurrences which entirely differ in their nature, consequences and mode of cure, as one disease, may serve the purposes of common language, but by no means those of medical science and medical arrangement.

In considering the natural arrangement of medical science exhibited above, it will be particularly necessary to avoid substituting the term "organ" for "function." The term "diseases of organs" expresses merely the seats of disease, whilst the term "diseases of functions" expresses their nature. Nevertheless a reference may also be made to the various organs, as it is evident that there may be disease of the vital or any other function in a mechanical organ. Thus a tumour in a bone is a disease of secretion, or an ulcer in a similar situation a disease of absorption; both being orders of the class—Diseases of the vital functions.

The first principle of the medical art, therefore, is founded upon a knowledge of the relations subsisting between the various states of the animal functions and the power of medicines, as exhibited in the preceding sketch of a natural system; and it consists in the application of the articles of the different genera of medicines (exhibited in the last column of the table) to the cure of the corresponding genera of disease (exhibited in the third one).

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One of the most beautiful results of the principle I have proposed is, that, by its adoption, it will be possible for the physician to lay his hand upon the several columns of a table, each of which, with regard to the diseases which it enumerates, is precisely similar in its nature from commencement to end; indicates correspondingly arranged articles of the *materia medica*, and requires precisely a similar mode of cure.





As the same arrangement is applied to the articles of the *materia medica*, the corresponding medicine will evidently, in every case, readily present itself to him.

But the most signal advantage resulting from it is, that, by merely assigning to any disease its place in nosology, the physician will instantly indicate the mode of cure which ought to be adopted for it.

I shall now then, Gentlemen, conclude by this important remark, that happily the tendency of this natural system of disease is not to controvert one established fact, but, by pointing out their relations, to simplify, consolidate and if possible to increase the amount of our knowledge on all the subjects of medicine.



SECOND PRELIMINARY LECTURE

TO THE COURSE OF

PATHOLOGY AND

THE PRACTICE OF MEDICINE;

EXHIBITING

A FUNDAMENTAL PRINCIPLE OF SURGICAL

OPERATION.

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GENTLEMEN,

THE vague plans of Surgical operation, at present practised, are too generally known, and too sincerely deplored, by every man of science and of feeling, to demand much of comment on the present occasion.

How often, in the attempt to take up an artery, does the ignorant and timid operator make an incision so limited that he is afterwards forced cruelly to extend it! How often, having extended his incision, does he find no artery beneath it, and dig or mine for it in a new direction, by cutting up the flesh of the patient! How often, having reached the place he sought for, does he mistake another artery, a nerve, or even a vein, for that which ought to be

the subject of operation ! How often, having found the artery, is he at a loss to recognize it ! What trepidation and alarms does not this operator, more miserable than the patient himself, endure !

I know no situation more wretched or more pitiable than this. Here, even at the best, the most exquisite torture is inflicted : the poor trembling patient, abstracted from every other earthly object, and with the most exquisite feelings concentrated on the present, awaits, in awful suspense, the impending stroke which is to divide the skin, that seat of accumulated sensibility, and deliver him from wretchedness ; but the hope is vain, his torments are again and again renewed ; he perceives that his life is the sport of a fool ; he writhes in agony, or sinks in deliquium ; and the issue is, as might be expected, too generally, even at the best, unsuccessful.

When all this is not the case, how often does the operator, on the contrary ignorant and rash, plunge his knife into some vital organ of the patient, and at once terminate his life and his diseases ?

That this picture is not too highly coloured, I solemnly appeal to the conscience and the feelings even of the best operators, who are too candid to deny that melancholy reflection has often oppressed them from the fate of patients—martyrs to their want of precision.

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To obviate this train of miseries ; to give ease and satisfaction to the operator, by conferring precision and success upon his operation, and to rescue from death, or rather from torture and agony, innumerable sufferers, are the results which I confidently expect from the adoption of

the following method. Nor can I say more in proof of its importance. I doubt not, that it will, ultimately, constitute the basis and direct the genius of surgery.

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There exists no other method of effecting this, than by the enunciation of the following principle ; namely, that there is, especially in such parts as are not liable to be deranged by voluntary motion, an invariable relation between the arrangements of internal and the situation of external parts, which may justly be considered as accurate signs of them ; in consequence of which, by adopting, on each side of the nerve, artery or other subject of operation, a fixed point, or one rendered fixed by particular positions of the body ; and by dividing, according to a line or rule, the space between these fixed points into a given number of proportional parts, *i. e.* parts, not equally large in all subjects, but uniformly of the same size, with relation to the whole which they compose, and generally differing in the male and female—by these means, I say, the situation of any given subject of operation, in any given part of the body, may be most accurately indicated, as being undeviatingly a certain number of proportional parts distant from the one, and a certain number from the other of these points.

Thus does anatomy, by what I term precise or real proportional measurements between fixed points, afford an obvious and simple, though hitherto unobserved, general means of rendering the operations of surgery perfectly precise and easy.

Indeed, such wonderful precision and ease do these real proportional measurements confer, that, by means of them, the finest instrument may be passed from the surface

of the body through any great nerve or vessel that is liable to be the subject of surgical operation.

Having stated this principle, I may merely observe, that, proceeding with all the ease and security, such accuracy must infallibly confer, it is, in all operations the first duty of the operator to ascertain by feeling, as nearly as possible, the thickness of cellular substance situate immediately under the skin of the patient, and then, with a bold and steady hand, to make an incision, deep in proportion to the thickness of that substance, and long in proportion to its depth, as well as to the additional depth and extent of the part to be operated upon.

These general principles excepted, other subordinate rules are chiefly applicable to particular operations.

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In order to illustrate this general principle, I cannot adduce a fairer or a better example than that which, according to it, is necessary to direct the taking up of the sub-clavian artery above the clavicle.

The patient must, in this operation, rest on the fundament, his body slightly inclining backward, so as to form an obtuse angle with the thighs, and his neck and head inclined backward so as to form with the trunk an angle similar to that formed by it with the thighs; the inferior of these angles being concave, the superior convex. This last may indeed be more properly called an irregular segment of a circle, formed in consequence of the vertebrae of the neck bending in that direction. In this position, therefore, the neck is, in general, in the same parallel with the thighs. The head of the patient is to be turned to the opposite side from that in which the operation is to be performed, where also the operator must stand. The

light must fall directly downward from the head of the patient.

In this case then, the bringing of the shoulder forward and downward, which I deem indispenible, however necessary to the ease of the operator, is not very material to the correctness of the measurement. It is however of some consequence ; for, as the subsequent measurement is dependent on the clavicle, and as that bone describes a portion of a circle in having its lateral end brought forward, every single point of it would, in that position, have a different relation to the vessels beneath from that which each would have had, if kept in its usual position.

Here then, the shoulder being in this position, and the arm held by the side, the measurement commences, and the fixed point chosen on each side of the immediate subject operation are the two ends of the clavicle ; as nearly between these as can be done, consistently with keeping quite clear of the bone, a line must be drawn superior and internal to it, and the given number of proportional parts, into which this line must be divided, are seven in number both in the male and female ; and now the situation of the artery may be most accurately indicated as being undeviatingly three of these proportional parts distant from the inner, and four from the outer end of the clavicle ; in consequence of which, if a fine instrument, held at right angles to the clavicle, were directed downward and inward, it would at 1 and  $\frac{1}{4}$  of the above mentioned parts from the surface of the clavicle, reach the artery, and being pushed farther, would pass through it.

This is an absolute demonstration of the precision and ease attending the principle I have announced, and of its applicability even to the most difficult of all operations.

In order, however, to perform the operation throughout, the point which I have indicated must be the center of an incision through the integuments made in the line above mentioned, and must extend at least two parts inward and two outward from the central point. Over the Trapezius outward, and over the clavicular attachment of the Sternocleidomastoid muscle inward, it is not advisable to cut deeper than the integuments, which sufficiently relieves the hand of the operator, without the present execrable practice of dividing the last mentioned muscle, which is not only unnecessary, but highly faulty, as this attachment serves as one of those particular points, above alluded to, incidental to certain operations, which, by means of its edge, kept lax during the operation, very nearly directs the knife to a small protuberance on the superior anterior surface of the first rib to which the scalenus primus is attached, and immediately external to which the artery itself lies.

Above all, the incision ought to be cautiously continued on the inner side, in order to avoid the large veins situate there; various branches of these veins may come in the way, and the more considerable may be easily avoided, but if not, they may be tyed.

In continuing the incision inward and downward, an ascending branch of the vein is in the way, which, when it is considerable, may also, previous to the continuance of the incision, be tyed. The incision itself, as you pass inward, must be very limited indeed, as the jugular vein is internal to it; and external to it there is a twig of the brachial nerve, both of which are much exposed to injury.

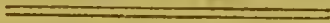
When the incision has been made one and a fourth of these proportional parts inward from the outside of the clavicle, you have reached the artery. It lays external to that protuberance of the first rib into which, as already observed.

the scalenus primus is inserted, and consequently to the insertion of the muscle itself. The twig of the nerve actually crosses the artery immediately below the point where the latter ought to be tied. The course of the artery is, in descending, obliquely outward, and the precise space in which it lays resembles an isoceles triangle formed by the clavicle, clavicular portion of the sterno-cleido-mastoideus and the omo hyodeus; its base being the clavicular portion of the sterno-cleido-mastoideus. The nerve is external and anterior to the artery, particularly its branch. Both the twig and trunk of the nerve ought to be seen by the operator before he attempt to take up the artery.

These directions are so precise, that, were the operator blind and the artery destitute of pulsation, he need not scruple to take up that which presents itself in the above mentioned situation.

By similar measurements, may every great artery in the body, liable to be the subject of surgical operation, be discovered with similar ease and precision, nor does there exist any other method of effecting this purpose.

I shall now then state the objections which may be urged against this principle.



It may be objected to the adoption of this fundamental principle of all surgical operation.

1st, That the accidental and probable fracture of the bone affording the fixed points, would, by deranging these points, render all such measurement inapplicable.

2d, That varieties in the distribution of arteries, and those deviations which are often produced by disease, would have the same effect.

I know not of any other objection that can be urged against it, and these I shall immediately answer.

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1st, To the objection that the accidental and probable fracture of the bone affording the fixed points would, by deranging these points, render all such measurements inapplicable, I answer, that, to chuse as an example the operation I formerly described, it is, in such a case, only necessary to transfer the measurement to the sound clavicle, and to convert the three inner or four outer proportional parts into absolute inches, quantities similar to which may then be measured from the corresponding ends of the fractured one, and thereby indicate the situation of the vessel or nerve with as great precision as if no fracture were involved.

2d, To the objection that varieties in the distribution of arteries, and those deviations which are often produced by disease, would have the same effect, I answer, that variety of distribution does not at all take place in some of those parts in which the most important operations have to be performed; namely, high in the groin, above and below the clavicle, &c. and that, wherever great deviation is caused by disease, it will generally be attended by external signs, according to which the operator may modify his measurements. I also further answer, that wherever deviation, from either of these causes, occurs, he who, by means of these measurements, knows the precise situation, according to the most usual and regular structure, will have the most decided advantage over him who is ignorant of it: the former will possess data, from which he can calculate probable deviations, the latter none; the former, even at

the worst, will have to *calculate*, the latter will be unable to do more than *guess*.

Thus I have answered the only objections that it is possible to urge against the principle proposed.

I have already said, that private objections by persons who dare not publicly make one, and who themselves cannot, by one or two incisions, approach within several inches of any artery, I shall uniformly despise, and shall only ask them to perform the operation with my youngest pupil.

I shall now deliver a short history of the method proposed.

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The want of some guide to the situation of internal parts, has long been felt. Fixed points have been adopted, but with no regularity. Measurements guessed by the eye have sometimes been used, but even they have almost always been absolute, *i. s.* measurements from one point; rarely proportional, *i. s.* measurements between two points. The few guessed proportional measurements, however, as for paracentesis abdominis, paracentesis thoracis, &c. which have been mentioned in surgical works, have, it must be confessed, been such as, from the magnitude of the parts with which they were concerned, required little more than guess. Such, however, as they were, they evidently depended upon no principle, but seem as if hit upon upon accidentally, and, at all events, were never generally applied.

Precise or real proportional measurements between fixed points, applicable to minute objects, *i. s.* such measurements as I have proposed and described, never have been, as far as I can discover, proposed and described be-

fore. And these precise or real proportional measurements, between fixed points, differ exactly as much from guessed ones, as the accurate cabinet, which was regulated in every part by the compass and square, would differ from the clumsy and unserviceable one, where every thing was constructed by guess. Here the parallel is so close, the difference in the results so striking, that I could not have adduced a better illustration.

The present proposition, of precise or real proportional measurements between fixed points, was communicated by me, about five or six years ago, to James Macartney Esq. lecturer on comparative anatomy, and the laws of organic existence, at St. Bartholomew's Hospital, and, in my opinion, one of the best comparative anatomists in Europe. I had no sooner announced it, than he assured me that a similar method had struck himself; and I deem this, so far as authority goes, no mean testimony in behalf of its value.

Mr Macartney, some time afterward, performed upon the dead subject, in the dissecting room at St. Bartholomew's, the difficult operation I have just described, according to the direction I have given, and both politely acknowledged me as the proposer, and bestowed on it his approbation. It is my duty to remark, that there is no person whose approbation could give me higher satisfaction.

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I cannot better illustrate the danger arising from ignorance of this principle, than by quoting an instance of repeated failure in the very operation above described, in consequence of such ignorance.

A professor at an hospital in London, generally reckoned one of the ablest surgeons of the metropolis, when

illustrating this operation in his lectures, first made the usual guessed cut, passing across one half of the Sternocleido-mastoid muscle; and, after some tearing and cutting, and innumerable complaints against the knives and the unfortunate assistant, told his pupils, "that they might think he had not yet got the artery, but he knew he had, and he should know it in the living subject, even if it did not pulsate." The subject, however, was carried from the lecture-room, and the ligature was found to be firmly fixed upon the nerve.

This mistake was very properly communicated to the ingenious surgeon, who never forgave the discoverer of it, but very wisely planned how he might avoid the same mistake, or, what he seemed to dread most, its consequences to his own reputation, in the subsequent course.

He had thus found, that ligatures left in the dead subject were more troublesome than in the living; and having tied something, which, to judge from the vague way in which he described it, might be a muscle as readily as an artery, he very properly, as his mind was not quite made up upon the subject, secured, to all appearance, his well-earned fame, by cutting off and withdrawing the ligature that nobody might see what he had done.

Unfortunately, however, curiosity and the wonder that it was possible for so great a surgeon to make so deplorable and dangerous an error, prompted a second examination of the subject. No ligature now remained to direct the enquirer's search; but alas! artifice could not obtain impunity even to reputation—the artery remained bedded in fat and untouched, the nerve alone was separated from the mass, and bore the mark of the ligature.

May the relation of these disgraceful occurrences, selected from numerous similar ones, which, to my know-

ledge, have taken place both in London and Edinburgh; but which, as, fortunately for their authors, they produce no injury to reputation, I am therefore unwilling to state—may it, I say, serve as a proof of the danger arising from ignorance of the principle I have proposed.

Now, may I ask, what are we to think of the supporters—the promulgators of such doctrines, and the abettors of their authors? Such men are to be found in Edinburgh, as well as in London.

Suppose, for a moment, one of these gentlemen, who are the deriders of precise and accurate methods, proposing to perform on the dead subject, in the most fascinating and splendid style, the operation for tying the femoral artery. He delivers a proem which shall verbally assure the pupil of its ease, but, by the complex flourishes of his knife, he intends to convince him it is difficult. He expects, however, that he shall speedily lay it bare, and that his dexterity, in the midst of such complexity, will produce the most brilliant effect. But alas! his first incision is made about an inch from the artery—still he cuts deep, in order to discover it—now he is embarrassed at his situation—next he mines off laterally, forms excavations under the flesh, and leaves the artery above the course of his incision—at last he reaches the profound, instead of the superficial artery, and comes off with the never-failing, and, in this case, ridiculous excuse, that there was an unusual distribution of it. . . . The errors of Surgeons have very curiously discovered a greater number of varieties in the distribution of arteries than ever were demonstrated by the labours of anatomists.

I have seen one of these surgeons commence such a disgraceful operation with more flourishes of the knife, than ever a dragoon used when performing the Saxon exer-

cise with the sabre. Contrast this with the plain and manly operator, every movement of whose knife has a meaning, because every movement of it is strictly adapted to effect the most useful of purposes.\*

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\* It may be surprising, but it is not inconsistent with human nature, that such men should be the persecutors of others; and it may perhaps be worth while to quote a few sentences from the production of such men directed against myself.

“ While an intimate acquaintance with the Anatomy of the human body, is absolutely necessary to him who wishes to practise Surgery, with credit and success, it must be acknowledged, that *those who are much occupied with dissection, are but too apt to overrate the practical importance of a minute knowledge of healthy structure.* That surgeon would indeed justly hazard the imputation of rashness and presumption, who would (*should* is here meant) imprudently venture to apply a ligature to the carotid or subclavian arteries, or attempt to remove the stricture in a strangulated crural hernia, without an accurate knowledge of the assemblage of important vessels which are included in the regions of the neck and groin: yet *we do not allow ourselves to be much influenced by the opinions of the anatomist who affirms, that there are certain fixed and invariable rules, according to which, in every case, those operations are to be performed.* We have learnt to infer, that the different regions of the body include almost constantly similar organs in every individual; and we know, that these organs have usually a general relation to each other, in form, magnitude, and position. Yet very little further observation is sufficient to convince us, that these relations do not admit of being determined with mathematical precision. The form and position of parts, ascertained with the most scrupulous accuracy in one individual, are not to be adopted as the basis of a system of rules, by which the operative surgeon

I have now only to add a few words concerning the necessity of such precise methods of operation in the present military state of Europe.

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is invariably to be directed in the practice of his art. 'To inculcate on the minds of the inexperienced, that surgical operation consists merely in the study of the external form, and that it is solely regulated by the mathematical bearings of certain prominences and depressions on the surface of the body, is to encourage the rash and the ignorant to sport with the lives of their fellow-creatures, and entail disgrace and misery on themselves.'

What must the liberal and candid think of this, when they are informed that the misrepresentations which I now quote, are the production of a party, of whom more than one intends to give a course of lectures on subjects similar to the man against whom they privately direct these attacks! . . . What they want in intellect and genius, they compensate for in numbers and in stratagem. I am aware that these gentlemen may influence some of better minds than their own; but I shall entrust their confutation and their shame to demonstration and the evidence of facts:

When *I* have mistaken the femoral artery for the profunda; when *I* have taken up arteries in amputation before sawing off the bone; and when, in attempting to perform the operation of Lithotomy, *I* have been forced to abandon it, publicly to attempt an explanation in apology for the blunder, and then obliged to leave it, to see whether THE STONE WOULD COME AWAY OF ITSELF! or be, as is perpetually the case on similar occasions, privately extracted by another—when I have done all this, and made myself an object of laughter even to the youngest pupil—then, then I shall cease even to speak of Surgery or Medicine.

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While such important operations remain in so vague a state, what ease would not such measurements confer, when, in the cockpit of the man of war or on the field of battle, the perplexed and bewildered surgeon knows not where to turn him, but must leave an hundred operations in an hour to an unexperienced assistant.

At a time, when a successful conspiracy of adventurous ruffians are, at the point of the bayonet, establishing, from the Don to the Douro, from the Scheldt to the Catto, over all the fairest provinces of Europe, the most dreadful of military despotisms;—at a time, when, to the shout “Avance, Avance,” louder and more tremendous than the noise of their guns, the myriad legions of France are carrying death and destruction before them, and sweeping together man and civilization from the face of the Continent;—at a time, when he who has “sceptres tipt with coronets for his pallisadoes, kingdoms for his martello towers and kings for his centinels,” threatens at once the liberties and the existence of Britain, and stains every step of his career with perfidy and blood;—at a time, when it is the duty—it is the wish of every man of honour successfully to defend, or, covered with wounds, nobly to die for the liberties of Britain and the emancipation of Europe—when all this is the case, what are not his duties whose sole profession it is, aided by science, to rescue from death or agony those whom tyranny has attempted to destroy, the genius of whose godlike art it is to save both friends and foes; and, upon whose knowledge, the existence and the fate of armies may, in no small degree, be said to depend.

Never were the duties of the military surgeon more complex or more formidable. Never did he stand in need of greater precision. And, in his art at least, he ought to recollect that no commissions are sold—the precisest knowledge alone entitles to—infallibly secures, pre-eminence and fortune.

## - POSTSCRIPT.

SINCE the publication of my Prospectus, and of the observations delivered in the previous note, the persons to whom that note alludes, have become ashamed of their conduct, and have, both in their lectures and through the press, asserted that I was not the object of their public attack; but that, *although it was quite unconnected with the object of the pamphlet in which it appeared*, yet they had taken the trouble to direct the attack against a gentleman at almost a thousand miles distance from them, and only two copies of whose book had ever reached the country; because, I suppose, they were alarmed lest, at that *short distance*, that gentleman should influence attendance upon their lectures, and lest a work so *widely diffused* over the country should “encourage the rash and the ignorant to sport, *by means of accurate measurements*, with the lives of their fellow creatures, and entail disgrace and misery on themselves. . . . *Humanity* is certainly deeply indebted to their generous, disinterested and philanthropic exertions! How much to be regretted that it has not ever had such guardians! Monuments doubtless, rivalling that of the hero of Trafalgar, will be erected to their memory—monuments of a nobler kind, because destined to record, not

the triumphs of war, but the triumphs of lectureship in anatomy, physiology and surgery, which certainly involve, not the destruction, but the preservation of lives.

What! M. Richerand, only at a thousand miles distance, influencing the *newly organized* courses of lectures in Edinburgh, and *two copies* of his dangerous book, proposing precise measurements in surgery, *actually* in the British empire.—Some gentlemen, perhaps, may be sufficiently ill-informed to imagine that the attack was really directed against so weak a creature as myself. How improbable! It is self-evident that I, *in Edinburgh*, could not have a thousandth part of the influence upon their lectures, that M. Richerand could *at the distance of a thousand miles*, and that my lectures, inculcating the principle *every day*, could not have a millionth part of the tendency to “encourage the rash and ignorant to sport, *by means of accurate measurements*, with the lives of their fellow creatures and entail disgrace and misery on themselves,” that *two copies* of M. Richerand’s book, *actually* in the country, must infallibly have. . . . He would be almost mad who could suppose the allusion was to me, because I was at hand and *therefore* could have no influence upon their lectures; I was delivering these opinions every day, and they *therefore* could not be disseminated: hence these gentlemen had no earthly interest in alluding to me. He, on the contrary, is wise who supposes that the allusion is to M. Richerand, because he is in Paris and *therefore* must have great influence upon their lectures; of his book even two copies are in the British empire and its sentiments *consequently* must be most widely disseminated; and it was *well contrived* and *inexpressibly humane* to introduce and firmly to oppose such a *desperate* character, even in a work upon a *different subject*. In short, these gentlemen had the nearest interest in op-

posing him.... Well, it must certainly be highly satisfactory to have thus opposed the progress of error and rescued the human race from *disgrace* and *misery*. Generous, disinterested, philanthropic defenders of *humanity*, you have your reward *in your own breasts*.

But their apology will not bear the test of ridicule. Let us therefore examine, in another way, the foundation upon which it rests.

After denying the truth of the principle they ascribe it to another. And who is ignorant that this has been the fate of every original proposition? M. Richcrand, they say, discovered it in 1805. Now granting, for a moment, the truth of this, I preceded him by a year or two at least, and James Macartney, Esq. lecturer on comparative anatomy, even constructed, twelve months before the time they mention, a work upon the principle, for which he was favoured with drawings by Charles Bell, Esq. at the time the discovery is ascribed to M. Richcrand. I mention these facts because, even granting the truth of what these gentlemen state, it refutes the assertions they found upon it.—I shall make a point of laying the further details on this subject (to me very important) before the medical world, which will show that, *even since I first enunciated the principle*, neither M. Richcrand, nor any other person, has even repeated the proposition, and I defy these gentlemen to produce an instance of it. This, however, I must remark, even these gentlemen most inconsistently grant; for they say that the proposal, which they assert was made by M. Richcrand, has been tried and has *failed*; whereas the proposition enunciated by me has been tried, has *uniformly succeeded*, and, such is its correctness, that it constitutes the basis of that part of my course which involves the operations of

surgery. Therefore, even according to themselves, *the propositions cannot be the same.*

I may now conclude by observing, that, notwithstanding the conduct of these gentlemen, I am far from bearing them any personal dislike,—but shall, on the contrary, be happy to labour with them in the same vineyard, and wish them the utmost success.

MR WALKER'S Course of ANATOMY and PHYSIOLOGY  
recommences on *Tuesday the 8th of November*, at ELEVEN  
O'CLOCK, a. m. and his Course of PATHOLOGY and the  
PRACTICE OF MEDICINE, at TWO O'CLOCK, p. m. and will  
be continued daily at these hours, at No. 63, SOUTH  
BRIDGE-STREET.

